

ICPC Asia Dhaka Regional Contest, 2024 (Mock)



Daffodil
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University



A

Problem A

Sort and &



You are given a permutation of size N . You want to sort it. In one operation you can swap the i^{th} and the j^{th} elements ($1 \leq i, j \leq N$) and it will cost you $i \& j$ (bitwise **AND** of i and j). Total sum of sorting the permutation is the sum of the cost of all the operations you will make. You can't make more than $3 \cdot N$ operations. Print the minimum cost to sort the permutation and also print one sequence of swap operations which will sort the permutation in the minimum cost.

Input

The first line will contain a single integer T ($1 \leq T \leq 10^4$). Each test case will start with one integer N ($1 \leq N \leq 10^4$), the length of the permutation. The next line will contain N integers a_1, a_2, \dots, a_N ($1 \leq a_i \leq N$). It is guaranteed that, in any input file $\sum N \leq 10^5$ across all the test cases.

Input file is large. Please be sure to use faster input/output methods.

Output

For each test case, the first line of the output should contain the minimum cost to sort the array. The next line should contain the number of required operations. Then each next line should contain two integers describing the indices being swapped. Please see the sample for details.

Sample Input

```
1
4
3 1 4 2
```

Output for Sample Input

```
0
3
1 4
1 2
3 4
```

Notes

Permutation of size N is an array of size N where each number from $1 \dots N$ appears exactly once.
 $i \& j$ denotes bitwise **AND** between integer i and integer j .

B

Problem B

ASCII Table



ASCII (American Standard Code for Information Interchange) Characters within the range 33-126 are the most frequently used ASCII Characters that are visible to the naked eye. These characters can be printed in tabular form in column major order in more than one way. Some of which are shown below:

<pre> ! (/ 6 = D K R Y ` g n u ") 0 7 > E L S Z a h o v } # * 1 8 ? F M T [b i p w ~ \$ + 2 9 @ G N U \ c j q x % , 3 : A H O V] d k r y & - 4 ; B I P W ^ e l s z ' . 5 < C J Q X _ f m t { </pre>	<pre> ! * 3 < E N W ` i r { " + 4 = F O X a j s # , 5 > G P Y b k t } \$ - 6 ? H Q Z c l u ~ % . 7 @ I R [d m v & / 8 A J S \ e n w ' 0 9 B K T] f o x (1 : C L U ^ g p y) 2 ; D M V _ h q z </pre>
33-126 valued ASCII Characters printed in a 7*14 Grid	33-126 valued ASCII Characters printed in a 9*11 Grid
<pre> !) 1 9 A I Q Y a i q y " * 2 : B J R Z b j r z # + 3 ; C K S [c k s { \$, 4 < D L T \ d l t % - 5 = E M U] e m u } & . 6 > F N V ^ f n v ~ ' / 7 ? G O W _ g o w (0 8 @ H P X ` h p x </pre>	<pre> ! + 5 ? I S] g q { " , 6 @ J T ^ h r # - 7 A K U _ i s } \$. 8 B L V ` j t ~ % / 9 C M W a k u & 0 : D N X b l v ' 1 ; E O Y c m w (2 < F P Z d n x) 3 = G Q [e o y * 4 > H R \ f p z </pre>
33-126 valued ASCII Characters printed in a 8*12 Grid	33-126 valued ASCII Characters printed in a 10*10 Grid

So no columns except the last one can have empty cells at the bottom but each column must contain at least one character (Filled from the top).

Now the problem is that somehow you have lost the dimension of the printed grid but you remember two characters that were printed in the same row. Based on this information you will have to find the possible dimension of the original printed grid.

Input

First line of the input file contains a positive integer **T** ($T \leq 10000$) which denotes the number of test cases to follow. Each test case consists of two space separated characters c_1 and c_2 ($33 \leq c_1, c_2 \leq 126$ and $c_1 \neq c_2$) as inputs in a single line. Look at the sample input for details.

Output

For each test case, produce one or more lines of output, each of which should contain two integers that denote the dimension of a possible (Row and Column) grid. These two integers should be separated by a single space. If there is more than one solution then they should be printed in the increasing order of the value of row.

Print a blank line after the output of each test case. Look at the output for sample input for details.

Sample Input

Output for Sample Input

2	1 94
A U	2 47
1 8	4 24
	5 19
	10 10
	20 5
	1 94
	7 14

C

Problem C

Point Table



Once upon a time, in the La Leuga football league, there were only three football teams: Team A, Team B, and Team C. Each team played against each other exactly once. So each team had to play two matches. For a win a team gets 3 points, for a draw each team gets 1 point and for a loss they don't get any points. The point table at the end of the season was as follows.

Table: Point table of La Liga (1927)

Team Name	Points
Team A	6
Team B	4
Team C	1

One day, a football fan was looking at the point table (the table is sorted based on team name) and noticed something strange. Team A has 6 points, which means they must have won both of their matches. However, Team B has 4 points, which means team B must not have lost any matches. This is a contradiction since Team A must have won their match against Team B and Team C. Therefore, the point table is invalid.

So, the La Liga authority decided to investigate further and asked for your help. You are given the points of team A, team B and team C. You have to figure out whether the given table is invalid or not.

Input

The first line will contain a single integer T ($1 \leq T \leq 350$), denoting the number of test cases. Each test case will have three integers P_A , P_B , and P_C ($0 \leq P_A, P_B, P_C \leq 6$), denoting their points in a single line.

Output

For each of the cases output "**Case <x>: <y>**" in a separate line, where x is the case number and y is the desired answer. If the point table is invalid, then print "**invalidum**", otherwise print "**perfectus**" (without quotes).

Sample Input

```
3
6 1 1
3 3 3
6 6 6
```

Output for Sample Input

```
Case 1: perfectus
Case 2: perfectus
Case 3: invalidum
```

D

Problem D

Pess Chuzzle



Random unrelated information: In chess, it is illegal to move 2 pawns simultaneously in the first move. If you are doing this, please do me a favor and stop.

You have an $n \times 8$ chess board. Rows are numbered 1 to 8 from bottom to top. Columns are numbered 1 to n from left to right. Initially there are n rooks on the bottom row. You also have a permutation p_1, p_2, \dots, p_n . A permutation is a sequence of n integers from 1 to n , in which all the numbers occur exactly once.

You have to move the rooks such that the rook which was initially at column i , ends up at column p_i of the bottom row. You also have to minimize the number of moves.

In a move a rook can move horizontally or vertically, but not over another rook. Two rooks can never be on the same cell at the same time.

Input

The first line contains the number of test cases T . First line of each test case has an integer n . The second line has n space separated integers p_1, p_2, \dots, p_n .

Constraints

- $1 \leq T \leq 100$
- $1 \leq n \leq 10^5$
- The sum of n over all test cases doesn't exceed 10^5

Output

For each case, output the minimum number of moves k . Each of the next k lines contain 4 integers $c1, r1, c2, r2$ meaning a rook is moved from column $c1$ row $r1$ to column $c2$ row $r2$. If there are multiple possible outputs, print any. Do **not** print trailing whitespaces in any line.

Sample Input

```
1
5
2 3 5 4 1
```

Output for Sample Input

```
8
3 1 3 2
2 1 3 1
5 1 5 5
3 2 5 2
1 1 2 1
5 5 1 5
1 5 1 1
5 2 5 1
```

E

Problem E

Pyramid



You have to make a pyramid shaped shopping mall with a square base in the desert. The surface area involves a lot of cost (Larger base needs more land processing and the larger sides creates a challenge for air conditioning in the heat of desert). So the total surface area (The square base + four triangular sides) will be fixed. Given this total surface area you will have to predict the volume of the largest possible pyramid.



Input

The input file contains at most **10000** lines of input. Each line contains a positive floating-point number not exceeding **1000000** which denotes the surface area of the Pyramid. Input is terminated by a line containing a negative value.

Output

For each line of input produce one line of output. This line should contain a floating-point number (rounded to four digits after the decimal point and there must be at least one digit on the left side of the decimal point) that denotes the maximum possible volume of the pyramid. You can assume that a very small precision error (for judge solution, output ± 0.0000001 produces the same output) will not cause a difference in output.

Sample Input

Output for Sample Input

0.01	0.0001
0.02	0.0002
-1	

<https://commons.wikimedia.org/wiki/File:Kheops-Pyramid.jpg>

F

Problem F

MathaMotaRogchota



In the world of competitive programming, the best minds gather to tackle complex challenges, shaping the future of algorithms and computation. ICPC contestants come here to prove their skills, ready to solve problems of monumental importance. Yet, ironically, amidst these high ambitions, we find ourselves entangled in the drama of online judge (OJ) platforms.

Consider **BAPS OJ**, a **non-profit** platform created by a "dedicated" group of unpaid moron enthusiasts, with grand visions of "serving the community" as a gift. But in the spirit of all things noble, their creators and their creations are none of our favorites. “গালি দেওয়ার মতো অন্তত একটা জাজ তো থাকতে হবে” :| So, they continued their journey with endless complaints, nitpicks, and criticisms—while the group humbly muttered something like, "Well, at least the last onsite went smooth!"

Meanwhile, on the other side of the OJ spectrum, there's a different crowd. Noticing the value of an online judge, some ambitious minds have turned it into a "premium service," marketing the OJ experience like a luxury product! With criticism of other judges, polished social media posts, and a "subscription model," they beckon coders to join the "exclusive" OJ club.

So here we are at the ICPC Dhaka Regional Preliminary, surrounded by irony and the battle between altruism and enterprise in the OJ world. Your task? Nothing complex. In fact, it's laughably simple, just like the complaints about BAPS OJ. All you need to do is print/say “**Ei Matha-Mota-Rogchota joddin achhe, non-profit diye kon ghaash ta katbo!**” and move on with life.

Input

The input file contains a single integer $T(1 \leq T \leq 10000)$.

Output

For each line of input produce one line printing “**Ei Matha-Mota-Rogchota joddin achhe, non-profit diye kon ghaash ta katbo!**” (without quotes).

Sample Input

Output for Sample Input

1	Ei Matha-Mota-Rogchota joddin achhe, non-profit diye kon ghaash ta katbo!
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